

1.0 Attendance

1.1 Members of the Standards Groups

Kevin Ryan (Secretary), Jens Erik Jensen, Erik Jeppeson,
David Christensen, Anders Ansted, Bengt Nilsson.

1.2 Members of the Development Group:

Jim Warwick, Bill Hyland, Bo Jonsson, Ingvar Gratte, John
Clack, Angus Quin, Roy Thornton, Ian Malcolm, Wynford James,
Poul Christensen, Kjell Andersson, Peter Burkinshaw, Helge
Lassen, Birgit Landgrebe.

2.0 Introduction & Welcome

David Christensen (DC) welcomed the participants to
Cambridge. He explained the charges for meals and
accommodation and what was included.

3.0 Administration

Kevin Ryan (KR) said he was not able to continue as
secretary as it was difficult to justify the travel costs
involved. However he would continue to act as secretary
until the next meeting. He asked where the group was now
going.

3.1 Agenda

DC took the chair and a general discussion on how to proceed
took place. Peter Burkinshaw (PB) said there was no point
in starting over again and discarding what had been done.
We should spot the "holes" and try to fix them.

DC said it was most important to get the right
standard, even if it meant starting again, and instanced
Fortran66 as a good standard. It would then be possible to
get many (16 bit) implementations of the standard. Angus
Quin (AQ) stated that there was a need to refine and correct
Comal80, before considering any major developments. Ian
Malcolm (IM) favoured a standard defined before anyone
implemented it, but said some variation should be allowed.

When KR expressed worry about compatibility Paul Christensen (PC) remarked that Pascal allowed exceptions to its standard.

Bill Hyland (BH) wished to move gradually towards a better standard. He suggested that a list be made of what is missing, bad or intolerable in the current standard.

Bo Jansson (BJ) who had just arrived, also favoured a gradual approach. When DC was pressed for an example of the present standard's failings, he stated that it was not defined how an array could be passed between procedures using the DATA statement.

BH again suggested that a list of problems be drawn up and asked that this be done by circulating the current standard and asking participants to write their comments on it. He felt that although Comal sold itself once it was available, the problem was that it was not available on enough machines.

When the discussion turned to the origins of Comal, Erik Jeppesen (EJ) said that Comal did NOT come directly from Basic. Major decisions were made in designing it, notably to remove all GOTOs to line numbers. It had been documented by Tom Oosterich. Jens Erik Jeppesen (JEJ) said this document had worked quite well as a standard in Denmark until Comal became more international.

As DC did not feel happy to continue as Chairman Wynford Jones (WJ) agreed to do so.

WJ, with the agreement of the meeting, began circulating copies of the existing standard for annotation.

3.2 Minutes of previous meeting (already circulated)

These were agreed and signed.

3.3 Administrative costs .

The secretary reported that there remained 532 Irish Pounds in credit and that payments were expected from TELI and from Regnecentralen.

3.4 Changes in group membership

The secretary read a letter from Metanic Aps resigning from the standards group. This was noted with regret, as was the liquidation of C. Rousing, another former member.

3.5 Date and place of next meeting

A discussion took place on the usefulness and the frequency of the standards meetings. When costs were mentioned, BH suggested that the EEC be approached. It was agreed that BH would draft a proposal seeking EEC funds, and that Danish and UK participants would approach their respective governments to see that it is supported at EEC level.

RJ said that the next meeting should go ahead in Stockholm as originally planned. Both TELI and the Swedish government attach great importance to the standards effort so funding would not be a problem. Participants would not have to bear costs for accommodation, meals or transport once they arrived in Stockholm airport.

3.6 Publicity

There was a wide-ranging discussion on the need for more publicity for Comal. This could help marketing as well as publicising the standards effort. RJ said we should emphasise the Comal success story, while JEJ remarked that Comal was used in Denmark outside education.

LUNCH

4.0 Packages.

After some discussion it was agreed that there were a number of topics requiring at least preliminary discussion, of which packages was the most urgent.

PB presented a paper from TELI describing their implementation of a minimal package facility. He felt there were 4 questions to be answered :

1.

How to interface to assembly language subroutines?

2.

How to declare the interface?

3.

How to join the calling program and the package?

4.

How to build a package?

The Teli solution was :

"Make the interface look like Comal, by using a normal PROC statement and adding "PACKAGE packagename". The package programs are called like any other procedure, but MUST have been previously LINKed. Listing of Package procedures can be enabled or disabled. The facility is limited to separately produced assembly language programs at present."

In discussion it emerged that the Unicomol package facility, used both USE and LINK. USE was a statement in a Comol program and LINK a command that must be used before first executing a program that uses packages. In doing this Unicomol had sought to maintain upwards compatibility with the TCO proposal on packages.

The discussion broadened to cover the benefits of packages, what objectives the two implementors had and how packages differ from EXTERNAL procedures. EJ explained how Regnecentralen had implemented EXTERNALs without having the overhead of relocating programs.

BJ and others felt there were a number of levels at which "outside" procedures could be provided. The simplest, suggested by Ingvar Gratte (IG), was to have a LIBRARY statement, "LIBRARY filename", which says that unknown procedures should be searched for in the named file. IG and Jim Warwick were to draft a proposal on this.

Following the suggestion of David Christensen (DC) it was generally agreed that whatever was implemented should be compatible with the eventual implementation of "full"

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packages as described in the TCD proposal.

CLOSE

Friday 28th September

John Clack (JC) took the chair.

5.0 Packages (continued).

The discussion focussed on the differing uses of LINK and USE by Teli and Unicomal. Both use LINK as a command, but in Unicomal's case the code is not loaded until a USE statement is encountered. This means that Teli's method is simpler but not as dynamic. In addition, Unicomal allow for proper scoping, so that packages used in a CLOSED procedure are only available in that procedure. It was felt that only the semantics of the statements (not commands) could be defined at present. Implementation would vary from system to system, so the definition would not refer to when or how code was loaded, memory allocated etc. DC & JEJ suggested that USE should have the effect of making procedures from a named set of packages available in the context in which the USE occurred. If any preliminary work, such as LINKing, must be done prior to executing the USE it was not the concern of the standard. KR is to put forward a formal proposal for the next meeting.

A problem remains about the visibility of package procedure names. It must be possible to know the interface that must be satisfied if a package is to be used successfully.

In the meantime all implementors should maintain compatibility with the TCD proposal, and propose changes to this proposal if necessary.

6.0 Proposal for a LIBRARY Facility.

JW introduced a draft definition of a LIBRARY facility which would allow a running program to invoke procedures stored in a separate file or files.

Proposal

There would be two new statements/commands :

1.

LIBRARY filename [,filename]

2.

NOLIBRARY

Informally, the semantics are as follows:

When a procedure or function call is encountered, and the named procedure does not exist in the current program, it is searched for on those external files listed in the most recently encountered LIBRARY statement. The files are searched in the order in which they are listed.

A LIBRARY statement may not occur within a procedure or function, and only one LIBRARY statement may be in effect at any time.

The NOLIBRARY statement has the effect of cancelling a preceding LIBRARY statement.

End Proposal

AQ asked if this would remove one of Comal's best features, that it reported errors as soon as possible. Similarly, JEJ was worried about when references are to be resolved. At present this can be done before execution, but the dynamic nature of what is proposed would make this impossible.

Roy Thornton (RT) and BH were strongly in favour of this facility. BJ and PB were concerned that the simplicity of Comal would be lost.

When implementation was discussed, Helge Lassen (HL), Kjell Andersson (KA) and EJ all had doubts about the feasibility of the proposal. EJ felt overlays were a better solution to this problem. BH and JW both argued that the facility was not just desirable but essential. BH pointed out that some Basics have had this facility for over 3 years.

On the proposal of the chairman JC, it was agreed that all implementors should respond to the LIBRARY proposal, by the end of October 1984 stating what they felt was desirable

and/or feasible. Where they felt the proposal was NOT feasible they should propose alternatives.

7.0 The USE Statement.

A modified version of the Unicomol statement was put forward for consideration. There was discussion about name clashes, separators, and the need to associate filenames with packages.

It was agreed that names in non-package programs took precedence over names in packages. If clashes occurred the name in the package could be qualified by preceding it by the package name.

<qualified name> ::= <package name>.<identifier>

If USE was to be the only statement or command needed to get a package into memory, the USE statement would require a filename. The following format was suggested :

<use statement> ::= USE <package name> [; <file name>]

LUNCH

8.0 Agenda (resumed)

JC opened a discussion on how the remaining time could best be used. Among the topics suggested were :

1.

The problems recorded on the copies of the standard, circulated earlier in the meeting.

2. Getting a student to do a formal definition of Comal.
3. Arrange the next meeting.
4. Comparison of Implementations.
5. Type declarations in Comal.
6. The PRINT statement.

7. Command language standardisation.

In a general discussion the following points were resolved.

A more professional version of the current standard would be produced by Acornsoft and distributed by the Secretary to enquirers.

DC, KR and BJ would attempt to get a suitable student and financial support to produce a more formal specification of Comol, with the intention of making a submission to an international standardisation body at a later date.

The next meeting would be hosted by Teli and would be held near Stockholm on 21st to 23rd of March 1985. Participants should arrive on the evening of the 20th and Teli will take care of transport and accomodation thereafter.

DC suggested that a comparison of implementations could be based on the Unicomal system, as it is the most widely distributed. This was not acceptable to some manufacturers. Instead it was agreed that as far as possible we should use multiple implementations for purposes of comparison.

For the remaining period the topics for discussion would be:

1.

Graphics

2.

Data Typing

3.

Publicity

4.

Command Language

5.

Comments on the standard.

9.0 Graphics.

KR proposed that anyone adding graphics to their Comal implementation should adopt either LOGO graphics or the ANSI Basic graphics. This was agreed.

10.0 Data Typing

PB felt the existing lack of type declarations in Comal was a syntactic dead-end. He did not like the proliferation of special identifiers (\$, #, % etc) and would prefer to predeclare new types. He asked for user opinions. IM felt integer, real and string was enough. PB then gave an example :

```
A# := A# + 1
```

but if we use

```
INT A,B,C
```

then we can write

```
A := A + 1
```

There was also the question of "superbig" reals. When DC queried the use of more than 32 bit numbers, BJ gave an example that needed 200 bits. DC suggested that perhaps what we need is a way to get the maximum precision. All other quantities would be simple integers. PC felt children would not want more types. AQ suggested that A# could be substituted for A before running the program. BJ pointed out that all Basics on the IBM PC had declared types. BM asked if this was intended for schools. RT wondered if it could be an alternative. IM said it would be needed if we added a RECORD statement at a later date. EJ insisted that we must have a type that need NOT be declared. BJ put forward the idea that beginners could use an undeclared REAL type and could move to INTEGERS (shown by #) later. However there was still a need for a long integer type. Double precision real was also needed. To define variables of different types, Basics have :

for Integer types DEFINT and DEFINTD

for Floating Point types DEFNBL and DEFNSGL.

JC thought the precision should be specified while DC felt the machine should check it.

11.0 Publicity

PC said Comal needs a higher profile. KR asked for news to be sent to him as secretary. BJ suggested articles, like the RYTE ones on Modula-2. JW felt it would help if we could write down what each company was doing. DC mentioned a recent review of Unicomal's Comal in the PCN, and said we should try publishing in the Times Educational Supplement. IG thought this might let the UK know how much Comal is used abroad. RT would co-ordinate anything to be sent to the TEL. AQ suggested Brian Grainger of British Aerospace as a possible author. IM said the decision to use Comal in Scottish schools would not be official until March '85. PC thought any press releases would be better sent through the companies. IG would like to see all the versions of Comal on display at the Stockholm meeting. DC suggested we get a publicity person in each country. After some discussion it was agreed that IG would co-ordinate publicity for the Nordic countries while RT would handle publicity for the English-speaking countries. KR is to circulate the address list of those involved in Comal and a revised list of implementations. JEJ would provide the address of the German Comal Users Group.

12.0 Command Language

KR began the discussion by explaining the origins of the TCD "Environment" proposal. It was a "blue skies" approach, ignoring all present implementations. DC could not see the objection to RUN, and besides RUN and EXEC do different things. KR accepted that EXEC was an immediate call to execute a procedure whereas RUN cleared the variable space first. BH wanted all commands to be statements if possible. DC gave an example of where RUN could be a statement.

```
AS := 'FRED'
```

```
RUN AS
```

There was a discussion on the merit of this and other features. The decision was to state:

The RUN command clears the variable space and then executes the first line of the program in memory.

CLOSE

Saturday 29th September 1984

13.0 Comments on the standard.

BH gave a summary of the comments written on the circulated standards. There were two general requests for additional material, more information on errors and the inclusion of syntax diagrams. BH classified the specific points as follows :

1.

17 Clarifications

2.

9 Additions

3.

10 Modifications

4.

3 Editorial Changes

5.

7 Mysterious !

The secretary was asked to circulate a summary of the comments.

NOTE

At time of writing the list of comments is not available to the secretary.

The least contentious changes related to the "keyword list". The secretary admitted that this had NOT been fully checked before inclusion. There were both omissions and errors in the list.

13.1 Omissions

Add the following : TAB ENDFUNC and FUNC.

13.2 Errors

Remove the following : USE DISCARD EXITIF GOSUB LOOP
ENDLOOP and LABEL.

The secretary was to re-edit this section and to circulate the resulting standard.

The chairman JC, then suggested we consider the "non-contentious" points raised in the survey. This was agreed. (Each point is identified by the corresponding production.)

13.3 Production 21

It was proposed that the FOR statement be changed to allow a DOWNT0 clause. There was NO general agreement on this. The suggestion that the DO should be optional was NOT agreed to either. It would depend on the system.

13.4 Production 55

Proposed that in DIM(value) the value could be real and would be rounded. This was AGREED, but required a definition of rounding.

13.5 Production 84

It was proposed that rounding should work as follows :

```
round(2.5) -> 2
round(1.5) -> 2
round(3.5) -> 4
round(-2.5) -> -2
round(-2.5) -> -2
```

Some believed this to be a British or International standard. It was AGREED that "in any situation where a real is provided for an integer Comal rounds." But the proposed

definition of rounding was NOT agreed at this stage.

JC pointed out that there was a divergence of opinion on the "rounding to evens" approach proposed above. RT felt rounding all .5s up was acceptable to all but numerical analysts. BH suggested we find out what is taught. IG said the proposed approach was taught in Sweden and the UK.

As there was no agreement JC closed the discussion.

13.6 Production 100 (Arithmetic Expressions)

Two points were raised : precedence of unary minus, and the operation of the logical operators.

Proposals were requested as to what value should result from -4^2 , should it be 16 or -16 ? Also should 4^{-2} be allowed ?

There was a long discussion on logical operators, particularly on whether they operate bitwise or not. For example the expression "1 AND 2" can be evaluated :

"logically" as T & T to return the value T

or

bitwise, as 01 & 10 to return the value 00 which is F.

There was disagreement as to the merit of allowing expressions such as "A\$ IN B\$ AND C\$ IN D\$". EJ explained that there had been a conscious decision to have NO distinction in Comal between logical and numeric values. A proposal that a note discouraging programmers from using AND OR and NOT with numeric values was defeated on a vote by 7 to 5. An alternative proposal that "Comal converts all numeric values to either TRUE or FALSE before any logical operations are performed" was passed unanimously.

It was further agreed that bitwise functions be included as a standard extension. These are :

BITAND ANDing

BITOR ORing

BITXOR Exclusive ORing

All three operate on negative integers in twos complement form.

EJ remarked that other functions might be machine dependent and so would be better located in packages.

13.7 Production 56

The question was whether DATA and RESTORE are scoped ? It varies from one implementation to another. JW is to propose a structured DATA statement.

14.0 Conclusion.

JC noted that the afternoon would be an informal discussion on error handling. BH introduced and distributed a paper on language standardisation.

The meeting closed at 1.05pm.